

## DISRUPTIVE TRENDS AND INCLINATION IN PASSENGER CAR SEGMENT OF FUTURE INDIAN AUTOMOBILE INDUSTRY

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### ABSTRACT

*Due to the emergence of economic process and alleviation there's a stiff competition among the auto industries that square measure focusing attention in capturing the Indian markets. Indian automotive trade changing into a high trade within the world. however the Indian automotive is one in every of the verge disruption.*

*Significant four technology trends might troubled trends and amendment the automotive trade. Those technology trends are Electrification, Shared mobility, connectivity and Autonomous driving In 2030, the share of E Electrical Vehicles (Includes BEVs, PHEVs, FCEVs and HEVs, across US, EU and China; does not embody delicate hybrids) might vary from 40 to 50 you look after latest vehicle sales. The marketplace for completely or partly integrated in-car motion-picture show systems might grow from eighteen million units in 2015 to fifty million by 2025 (15) given the convenience offered by such systems India is unambiguously positioned to leapfrog personal vehicle possession, and is anticipated to be a frontrunner in shared mobility with shared miles expected to succeed in 35th of all the miles cosmopolitan by 2030 and 50 you interested in 2040. OEMs across the world do that by adding progressive autonomous functions as driving technology and infrastructure improve over time*

**KEYWORDS:** Automotive Industry, Globalization and Liberalization, Shared Mobility, Connectivity and Autonomous Driving, Automobile Disruptive Trends & Inclination in Future Cars

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### INTRODUCTION

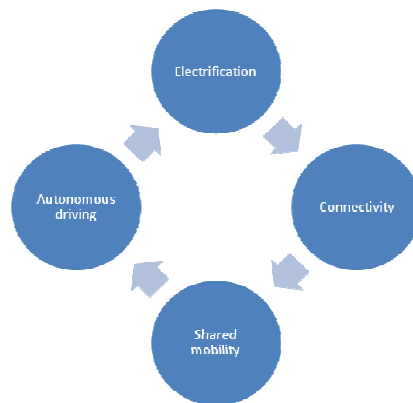
The Automobile industries addressing the problems area unit Environmental Imperatives. The Indian industry is on the verge of the disruption thanks to the outcomes key technology-driven trends and stricter emission laws, lower battery prices, additional wide obtainable quick charging infrastructure, increasing client acceptance and higher total price of possession (TCO) can produce new and robust momentum for the adoption of EVs within the close to future (1).

A group of world automotive specialists indicated that this disruption may considerably have an effect on the automotive worth chain 75 % believe that new technological players within the trade may acquire a substantial share of revenues and profits from ancient businesses by 2030 and 88 % agree that some OEMs or suppliers might even stop to exist by that point thanks to the arrival of EVs (2).

### Disruptive Trends within the World Automotive Trade

Four technology-driven trends area unit disrupting the worldwide automotive trade. These can reinforce one another to impact a shift in markets and revenue pools, amendment mobility behavior and build new avenues

for competition and cooperation.



Sources: McKinsey Center for Future Mobility

**Figure 1**

### **Electrification**

In 2030, the share of EVs (Includes BEVs, PHEVs, FCEVs, and HEVs, across the US, EU and China; doesn't embody delicate hybrids) may vary from 40 to 50 % of latest vehicle sales (3). Adoption rates may well be the very best in developed, dense cities with strict emission laws and better client incentives (tax breaks, special parking, and driving privileges, discounted electricity, etc.). Penetration is also slower in tiny cities and rural areas with less charging infrastructure and a better dependence on the golf range. Continuous enhancements in battery and charging technology may minimize such native variations, and EVs area unit expected to realize additional market share from standard vehicles(4).

### **Shared Mobility**

Mobility options like car-sharing, bike-sharing, ride-sharing (carpooling and vanpooling) and on-demand ride services (5) are gaining significant traction in metropolises. Shared mobility offers easy, on-demand availability, the flexibility to choose vehicle type as per need and freedom from parking hassles. It also cuts down costs related to car ownership, such as maintenance, service, and insurance. In the US, the percentage of vehicle miles traveled in ridesharing cars stood at one percent in 2016(6).

### **Opportunities for Shared Mobility in India**

India is unambiguously positioned to leapfrog personal vehicle possession and is anticipated to be a frontrunner in shared mobility with shared miles expected to succeed in 35% of all the miles cosmopolitan by 2030 and 50 % by 2040 (7)

### **Low Per Capita Vehicle Ownership and a High Share of Public Transit**

Personal vehicle possession in India is extremely low. Per a thousand individuals, personal automobile possession is as low as thirty-two as compared to 797 within the USA (8). Around 60% of the Mobility demand in India is served by public transportation modes like buses and metros and non-motorized transport modes (walking and cycling) (9). The high mode share in favor of existing varieties of shared transport, as well as buses and intermediate par transit modes like shared auto rickshaws, will support the transition to shared mobility solutions.

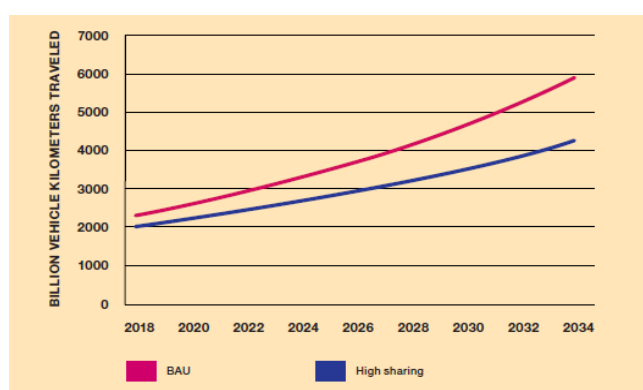
### Supportive Framework for Shared Mobility

India is commencing to place in situ validating policies for shared mobility and conversion, and a number of other states have developed policies to control the shared mobility system. In December 2016, the Ministry of Road Transport and Highways printed taxi policy tips (MoRTH guidelines) (10). The report highlights the requirement to liberalize the prevailing taxi allow systems, acknowledges numerous varieties of sharing of personal and industrial vehicles, and promotes sharing of buses, motorcycles among alternative recommendations. Taking a cue from the MoRTH tips, many state governments like Rajasthan and Tamil Nadu have started recognizing the varied shared mobility models and therefore the want for the regulative system to support them. Many alternative key government policies like the National Urban Transport Policy (2014) promote the conception of shared mobility given its vision to maneuver individuals and not vehicles. National Information Sharing and Accessibility Policy promotes a technology-based culture of management and data sharing and access (11). These and similar alternative policies give the mandatory system for introducing and promoting shared mobility. The projected motorized vehicles change Bill 2017 additionally focuses on higher utilization of transportation assets, increasing the accessibility and mobility of individuals, rising urban transport, and reducing hold up at the state level.

### Benefits of Shared Mobility

Shared mobility features a range of potential edges, most of that arise from a rise in system potency through higher plus utilization and improved property. Whereas personal vehicles usually sit idle, or with low occupancy, shared vehicles area unit usually higher used, with additional passengers and product in obtainable vehicle house and better utilization, resulting in a reduction in total vehicle kilometer cosmopolitan, lower fuel consumption, reduced emissions and lower price of transportation.

### Effect of Sharing on Vehicle Kilometers Traveled in India



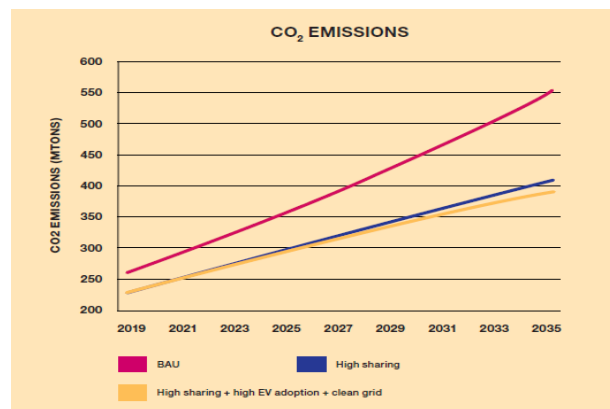
Source: Niti Ayog, Global Mobility Summit Report Sep 2018

Figure 2

### Total Vehicle Kilometers Travel to Meet Motorized Transportation Demand in BAU and Shared Mobility Futures

Reduced vehicle kilometers cosmopolitan, combined with electrification of the fleet, interprets to a discount in CO<sub>2</sub> emissions. India will cumulatively saves to 1.5 giga tonnes of CO<sub>2</sub> through 2035 if sharing and vehicle electrification is promoted. A further 100 megatons of CO<sub>2</sub> will be saved if India meets its declared NDC targets by sourcing electricity

generation from renewable sources. Figure eight shows CO<sub>2</sub> emissions in BAU, shared mobility future, and shared mobility future with high renewably sourced energy generation.



Source: Niti Ayog, Global Mobility Summit Report Sep 2018

Figure 3

Figure: CO<sub>2</sub> emissions in BAU, shared mobility future, and shared mobility future with high renewably sourced energy generation

## CONNECTIVITY

The automotive property contains four relevant useful teams in-car content and services (e. g., navigation or entertainment), vehicle relationship management (e. g., remote diagnostics), insurance (e. g., telematics-based insurance solutions) and driving help (e. g., semi-autonomous driving features) (14). The marketplace for absolutely or partly integrated in-car moving picture systems may grow from eighteen million units in 2015 to fifty million by 2025 (15) given the convenience offered by such systems.

The fast advancement of car technology is dramatically sterilization transportation models round the world. From early-stage client moving picture options, to ride sharing and on-demand mobility services, to totally autonomous vehicles within the future, property within the automobile has been the propulsion behind recent automotive engineering advancements. As a result, vehicles have morphed into way more than simply the simplest way to induce from one place to a different, however, extensions of client digital lifestyles and a catalyst for vital amendment within the approach society can expertise future mobility.

### Young Population and Growing Entrepreneurial Culture

More than 50 %of the population in India is below the age of twenty-five and over sixty-five is below the age of 35. A young population is also additional inclined to adopt new and innovative concepts (12). India is a rising entrepreneurial culture any supports the event of innovative shared mobility solutions.

### Growing Smart Phone Penetration and Internet Connectivity

India is recognized as a world leader in technological development and innovation and features a high penetration of data-supported technologies. Smartphone penetration in India is anticipated to grow to 530 million active users whereas the quantity of net users is anticipated to succeed in 450-465 million by 2019(13). High penetration of smart phones and higher net property boost the adoption of shared mobility solutions and services.

An economical and comprehensive facility is important for supporting a well-functioning and prosperous community. Transitioning to a shared mobility future can permit India to create a facility that's additional economical, cleaner, and meets the wants of its growing population.

### **Connecting the Car**

The connected car was establishing connectivity between the vehicle for call center and concierge services like GM's On Star. Many automakers followed suit and introduced similar safety and convenience services. Simultaneously, Bluetooth technology was introduced which enabled drivers to safely make and receive "hands-free" phone calls while in their vehicle for the first time. This phase wouldn't last long however, as the widespread consumer adoption of more sophisticated smart phones drastically altered the driving experience and in-vehicle environment.

### **Infotainment System**

Vehicle property was driven by the introduction of smart phones and pervasive use of mobile apps. The investment the property that preceded it, moving picture quickly became a must-have feature for brand spanking new automobile consumers, particularly millennial. the primary moving picture service was proclaimed by Ford in 2007, and by 2015, all major automakers had integrated some sort of moving picture system into their vehicles. moving picture programs allowed fashionable apps like Spotify and Pandora to enter the vehicle setting, mirroring the already acquainted smart phone-based mobile expertise and lengthening customers digital way into their cars.

### **Software and Data Management**

The phase we're currently in, vehicle technology is advancing again with the introduction of over-the-air (OTA) services, which enable the transmission of software updates and data between a vehicle and the cloud. For context, imagine if you had to go to a physical retail store every time you needed to update your Smartphone operating system or apps. It would be very inconvenient, correct? Similar to a Smartphone, vehicle software will increasingly need to be updated as well – and OTA technology allows this to happen remotely. Prior to OTA, consumers had to visit dealerships to get their vehicle software updated, a costly burden for automakers and a hassle for vehicle owners. With OTA, global automaker cost savings for mitigating software recalls and cyber security threats alone are forecasted to increase from \$2.7 billion in 2015 to \$35 billion by 2022, according to research firm IHS.([www. Businesswire.com/new/home](http://www.Businesswire.com/new/home)).

## **AUTONOMOUS DRIVING**

Various world automakers and technology corporations area unit following and investment within the creation of autonomous-driving vehicles. ancient vehicle makers, too, area unit already taking a rather totally different track in their development processes, operating severally and with leading suppliers to develop and start implementing technologies that augment driver behavior. OEMs across the globe do this by adding progressive autonomous functions as driving technology and infrastructure improve over time. If autonomous driving dashes in a very huge approach, with validating laws, up to fifteen % of all new vehicles oversubscribed globally in 2030 may well be absolutely autonomous(16). In India, however, the govt. is presently cautious of self- or autonomous-driving cars thanks to issues that these might hurt employment opportunities (17). An amendment within the government's position within the future might shift the relevancy of this world trend for India.

The introduction and adoption of absolutely autonomous vehicles, those requiring no human intervention, can dramatically alter the long run of mobility. because the wheel disappears from vehicles altogether, vehicle style can radically rework as automakers shift to accommodate extra technology developments just like the introduction of computing (AI), new transportation models, and increased user experiences. wanting towards Associate in Nursing autonomous future, transportation can now not be focused on the standard conception of individual automobile possession in favor of a brand new era of smart transportation and on-demand mobility services. vehicle property has been central to several of the foremost automotive engineering advancements over the last twenty years, and can still impact the approach society experiences transportation going forward.

### **Technical Regulation - Emission Norms**

Automobile Industry ought to address the problems of environmental imperatives, safety needs, Competitive pressures, and client expectations. there's a robust inter linkage amongst of these forces of amendment influencing the car trade. These got to be addressed systematically and strategically to confirm the fight. Since pollution is caused by numerous sources, it needs Associate in a Nursing integrated and multidisciplinary approach. the various sources of pollution got to be addressed in Associate in the Nursing integrated approach to achieve the target of cleaner setting and meet National Air Quality standards.

The Parameters determining emission from vehicles are Vehicular Technology, Fuel Quality, Inspections and Maintenance in use of vehicles and Road and Traffic Management. These four factors mentioned above have direct environmental implications. The vehicles and fuel systems have to be addressed as a whole as requisite fuel quality is required to meet the emission standards.

### **Vehicular Technology**

In India, vehicle technology has evolved to meet the emission and safety regulations notified as per the Auto Fuel Policy specifying the emission roadmap and safety regulations as per the Safety Roadmap adopted by the CMVR-TSC. Today the vehicle technology in India is at par with the international benchmarks as Indian safety standards are being aligned with Global Technical Regulations (GTR) and UN Regulations. India is a signatory to UN WP 29 1998 agreement which develops GTRs. India actively participates in the UN WP 29 body and contributes significantly so that the GTR reflect the driving conditions and requirements of the developing countries.

### **History of Emission Norms in India**

Vehicles are one of the contributors to air pollution and there is a need to reduce vehicular emissions on a continuous basis. Indian Automotive Industry recognizes this fact and is continuously working towards controlling emissions as per the roadmap suggested by the Auto Fuel Policy and proactively developing environment-friendly technologies. India today has some of the most fuel-efficient vehicles in the world. The first stage of mass emission norms came into force for petrol vehicles in 1991 and in 1992 for diesel vehicles.

From April 1995, mandatory fitment of catalytic converters in new petrol passenger cars sold in the four metros, Delhi, Calcutta, Mumbai and Chennai along with a supply of Unleaded Petrol (ULP) was affected. Availability of ULP was further extended to 42 major cities, and it is now available throughout the country.

In the year 2000, passenger cars and commercial vehicles met Euro I equivalent India 2000 norms, while two-wheelers were meeting one of the tightest emission norms in the world.

Euro II equivalent Bharat Stage II norms were in force 2001 onwards in Delhi, Mumbai, Chennai, and Kolkata.

The first Auto Fuel Policy was announced in August 2002 which lays down the Emission and Fuel Roadmap up to 2010. As was given in the roadmap, four-wheeled-vehicles moved to Bharat Stage III emission norms in 13 metro cities from April 2005 and rest of the country moved to Bharat Stage II norms.

Bharat Stage IV for 13 Metro cities was implemented April 2010 onwards and the rest of the country moved to Bharat Stage III. Bharat stage IV norms were extended to additional 20 cities October 2014 onwards.

The Auto Fuel Policy 2025 was submitted to the Ministry of Petroleum & Natural Gas (MoP & NG) which had constituted an expert committee for the formulation of the same in December 2013. The document is currently hosted at the MoP & NG's website. This policy document laid down the emission and fuel roadmap up to 2025.

The proposed roadmap envisaged implementation of BS IV norms across the country by April 2017 in a phased manner and BS V emission norms in 2020/2021 and BS VI from 2024.

However, the Delhi, NCR region of North India became notorious for its drastic rise in air pollution levels. This attracted attention and subsequently led to the government making a conscious decision of leapfrogging Bharat Stage V emission norms that were subject to implementation in 2020, as well as advancing introduction of Bharat Stage VI emission norms from 2024 to 2020.

Since India embarked on a formal emission control regime only in 1991, a gap in the implementation of these norms in comparison to Europe can be noticed. However, this gap has helped in the technologies to mature which in turn facilitated the Indian Auto sector in meeting the regulations at an affordable cost for the Indian consumers.

### **Fuel Technology**

In India, we have a tendency to area unit however to handle the vehicle and equipment as an entire. It was in 1996 that the Ministry of Environment and Forests formally notified fuel specifications. A highest limit for critical ingredients like benzene level in petrol has been reduced continuously, from time to time, and was specified as 5% m/m and 3% m/m pa India and metros, respectively. This limit now stands at 1%, which in line with international practices.

To address the high pollution in metro cities, 0.05% sulphur for petrol and diesel has been introduced since 2000-2001. The same has been reduced to 0.005% in April 2010 in 13 metro cities for both petrol and diesel. 350 and 150 ppm for diesel and petrol, respectively, in the rest of the country, the limit on sulphur content for petrol and diesel is 150ppm and 350ppm, respectively. This content would be reduced further to 10 ppm in BS V and BS VI fuels in line with Auto Fuel Policy 2025. There is a need to completely align the fuel properties with European fuel quality so that vehicles can meet BS VI emission norms and also the durability requirement.

### **Inspection & Maintenance (I & M) of In-use Vehicles**

It has been calculable that at any purpose of your time, new vehicles comprise solely V-E Day of the overall vehicle population. In India, presently solely transport vehicles, that is, vehicles used for rent or reward area unit needed to



bear periodic fitness certification. The big population of personal vehicles isn't however coated by any such necessary demand.

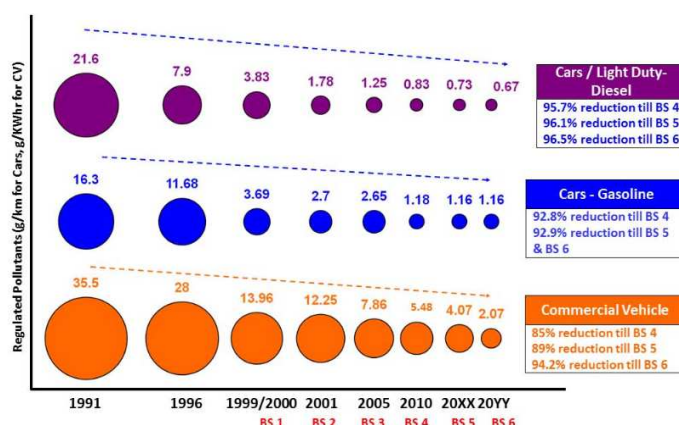
In most countries that are able to management transport pollution to a considerable extent, scrutiny & Maintenance (I & M) of all classes of vehicles has been one amongst the chief tools used. Developing countries within the South-East Asian region, that until a couple of years back had severe pollution issues, have introduced an Associate in Nursinging I & M system and good traffic management arrange.

### Road & Traffic Management

Inadequate and poor quality of road surface leads to increased vehicle operation costs there by increased pollution. It has been estimated that improvements in roads will result in savings of about 15% of vehicle operation costs.

The need for an integrated holistic approach for controlling vehicular emissions cannot be overemphasized. More importantly, auto and oil industries need to come together for evolving fuel quality standards and vehicular technology to meet the air quality of targets.(18)

### Reduction of Aggregate Pollutions Since 1991 (4 Wheels)



Source: SIAM India Technical Regulation

Figure 4

## THE WAY FORWARD FOR E-MOBILITY IN INDIA

Besides the end-users or customers, three key stakeholders could play an integral role in India's transition towards EVs

### The Government

By defining the regulations on emissions and fuel efficiency, clarifying aspirations, strategic intent, and direction, exploring incentives and subsidies, it can support EV adoption and focus on developing a supportive ecosystem

### The Power, Fuel and Charging Infrastructure Companies

By laying down a foundation of support, innovating on business models (e. g., leasing of batteries, swapping infrastructure, deploying fast chargers), making the economics of (fast) charging infrastructure work, providing stable power supply and grid stability, they can enable easy and rapid charging and drive EV adoption.



### **The Automotive Industry**

By changing the product and component mix bringing EV components and vehicles to life, building the right talent pool and skill set, improving the performance of batteries and electric vehicles and building scale, the industry can drive the EV disruption in India.

### **India Aiming for all-Electric Car Fleet by 2030**

India is staring at having Associate in Nursing all-electric automobile fleet by 2030 with Associate in Nursing specific objective of lowering the fuel import bill and running price of vehicles. " Government is reaching to introduce electrical vehicles in a very huge approach and create electrical vehicles self- ample like UJALA. the thought is that by 2030, not one fuel or diesel automobile ought to be oversubscribed within the country, in of the read that originally the govt. will appendage the electrical vehicle trade for 2-3 years to assist it to stabilize. Citing the instance of Maruti, that has logged over thirty per cent profit now, the govt. had supported India's largest automobile maker at the start, that eventually junction rectifier to development of the large automotive trade within the country (19).

### **The Impact of Electrification on India's Automotive Industry**

With increasing urbanization return environmental challenges thanks to high levels of car emissions. To combat this, governments across the globe have proclaimed laws on emissions and potency that area unit expected to become tight with time. Within the case of India, oil imports account for a major portion of this account deficit and additionally produce dependence on sure world regions to satisfy fuel wants of the country (20). Electrification emerges, therefore, as Associate in Nursing progressively enticing avenue of exploration, and e-mobility, or the electrification of the automotive power train (21). With in the kind of xEVs (e. g., powered electrical vehicles, hybrid electrical vehicles, plug-in hybrid electrical vehicles) may well be the approach forward. As per a NITI Aayog report, India may saves 64 % of energy demand for road transport and 37% of carbon emissions by 2030 by following a shared, electrical and connected Mobility future (22).

### **Drivers of EV Adoption**

While world EV sales presently form less than 1 percent of new car purchases (23) this may soon change, with a mix of push and pull factors creating a self-sustainable cycle of EV growth over subsequent few years. Earlier in 2017, former Power Minister Piyush Goyal announced the aspiration to not sell a single petrol or diesel car in the country by 2030<sup>21</sup>. With such a thrust, both the push and pull factors of EV adoption could shape the e-mobility landscape in India. Globally, governments are working with the private sector to build EV infrastructure for sustainable growth. These efforts may boost EV sales and demand and facilitate investment in research and development, possibly reducing the cost of critical components like batteries due to growing scale. These indirect gains could generate customer "pull" to further enhance sales.

### **Infrastructure**

Three key factors cell energy density charging speed and swappable battery infrastructure determine the supply and quality of the fast-charging infrastructure required. Every one of those factors is evolving by the day. The supply of charging infrastructure is an important think about reducing the period of time for EV customers. Recognizing this concern, China is focusing heavily on EV infrastructure it is building around 12,000 centralized charging or battery swap

stations and nearly five million scattered charging poles by 2020 to satisfy the charging demand of five million EVs effectively aiming for one charging purpose per car (24).

### **Customer Demand**

The automotive trade in India caters to several varied segments of finish customers across two wheelers, three wheelers, passenger cars, off-road and commercial vehicle segments. Moreover, there areas unit variations supported finish to use as a personal or public vehicle. Participants at recent trade roundtables(25) organized by the McKinsey Center for Future mobility indicate that vehicle segments like buses, 3 wheelers, scooters, and tiny industrial vehicles can see quicker xEV penetration. These are followed by traveler cars (taxis can doubtless see quicker adoption than in private closely-held vehicles) whereas medium and serious industrial vehicles are the slowest to maneuver to electrical power trains.

### **The Government**

The government may play a significant role in driving EV penetration providing electrification may facilitate meet emission targets and scale back dependence on oil imports, EVs became a district of mission documents for several governments globally. Any country determined to support EV adoption ought to concentrate on developing a validating system, very similar to Norway has done. The Indian government above all may concentrate on three areas.

### **Environmental Targets and Strategic Intent**

The Indian governments current CO<sub>2</sub> emission target (based on the Paris Climate Treaty) is to keep up 113 g/km by 2021; the typical fuel potency target, in line with the company Average Fuel Consumption (CAFC) normal, is twenty-two km/liter by 2022(26). The govt. additionally features a long-run strategic concentrate on reducing oil imports and therefore the implicit dependence on sure trade partners.

Consistent and stable government policy on emission laws and well outlined strategic targets on oil substitution may provide a lot of required long-run clarity to the automotive trade, sanctioning corporations to arrange pipelines before. the govt. may additionally originate committees to produce steerage as and once trade stakeholders want any support to attain their targets.

As it drives EV penetration through policy and future direction, the govt. may additionally outline its level of participation within the suggests that utilized to satisfy the policies and targets. Globally, most governments outline laws and targets that area unit technology agnostic, and therefore the trade chooses a portfolio of technologies to confirm compliance.

### **Incentives and Subsidies**

Currently, the TCO economics of EVs do not work for either the customer or the charging infrastructure providers. the govt. may have to be compelled to drive adoption, as seen within the case of the Scandinavian nation, through a range of avenues like direct or revenant incentives, tax breaks, funding for infrastructure and innovation, support for technology localization and talent development. The Indian government launched the celebrity (Faster Adoption and producing of Hybrid and electrical Vehicles) India theme in Apr 2015 to support the event of the hybrid and eV market and producing system through subsidies. Of the overall part one allocation in FAME solely around twenty-five % has been employed by August 2017(27). FAME additionally underwent changes midway the NITI Aayog took it over from the Department of serious Industries and delicate hybrids were aloof from the schemes coverage list(28).

As public policy influences the automotive sector, all key stakeholders within the government could work towards a unified, transparent and predictable decision-making system. A comprehensive set of EV guidelines could help the government to meet its aspirations and milestones for emissions and efficiency. In addition, an exhaustive list of parameters for product inclusion or exclusion from the FAME scheme could help automotive companies in deciding their product pipelines and improve the utilization rate of funds offered under the FAME scheme. A clear mandate and goal for each department within key ministries could help to make the EV policy more predictable and improve its coordination with schemes like Make in India

Setting long-term EV aspirations could help the government ensure sustainable penetration and define a roadmap for the industry while giving the industry enough time to prepare and act. For example, India's current EV-adoption commitment to the Clean Energy Ministerial (CEM) aims at 30 percent new sales of electric passenger cars, light commercial vans, buses and trucks (including BEVs, HEVs, PHEVs, and fuel-cell vehicles or FCEVs) by 2030. (29).

### **Infrastructure-Power, Oil & Gas, and Charging**

Infrastructure companies that can drive EV penetration include oil and gas companies, power companies, charging equipment manufacturers, swappable battery infrastructure providers, and electric mobility solution providers. Companies in India that have the potential to develop EV infrastructure could work on three focus areas

Alternate business models: Globally, EVs could displace a demand of 2 million barrels of oil per day between 2025 and 2030 (30). While oil marketing companies (OMCs) could see this as a threat, they could also see it as an opportunity to expand into different business areas. For example, a notable energy producer and provider bought a battery manufacturer to expand its renewable energies business. Opting for alternate asset utilization has led some major oil companies to offer EV charging infrastructure at their oil pumps.

Association of India (ARAI), the Indian Space Research Organization (ISRO), and Bharat Heavy Electricals Limited (BHEL) working together on a project to explore the applications of lithium-ion battery technology for surface transport vehicles (31).

### **Power Generation and Grids**

Even with approximately 30 percent penetration across two-wheelers and four-wheelers in India by 2030, EVs may need only 3 to 4 percent of today's power generation capacity. Along with energy companies, the government, too, could help to identify any real concerns emerging from additional requirements on existing grids. For instance, short-range vehicles like personal cars could predominantly be charged at home, which will require a stable and reliable power supply. Proactive analysis and planning could help prevent issues with the network infrastructure.

### **Charging Infrastructure**

A 2016 survey in China showed that BEV and PHEV sales tripled over the last five years largely due to substantial government investments in improved EV charging infrastructure(32). A robust charging infrastructure could be the key to ramping up EV sales in India. In 2016, India had fewer than 500 EV charging stations spanning major metropolitan cities like Delhi, Mumbai, Bengaluru, and Kolkata(33). But by 2030, a city like Delhi could require around 300,000 fast chargers, presuming 30 percent EV penetration into an estimated car parc of 10 million. Around 12 percent of these would be taxis—the primary users of fast chargers. Meeting this infrastructure need could call for an investment of

around USD 1 billion to 1.5 billion (34).

## CONCLUSIONS

There is no denying that e-mobility is here and currently, which its growth may impact automobile part makers in India in a very huge approach. It's imperative for automobile part makers to start out making ready for the following disruption Indian automobile makers got to collaborate with corporations UN agency has the requisite technologies and embrace them, or run the danger of losing their turf, particularly to Chinese corporations, in line with the ACMA presentation to NITI Aayog. The move to e-mobility is inevitable. It brings with it challenges and opportunities for the automotive trade and therefore the broader system to take advantage of new technologies, and, within the method, reap substantial economic edges and scale back dependence on fossil fuels. cooperative efforts by key stakeholders will facilitate EVs become an independent and profitable market within the near-term future.

India my leader in hared mobility and young people are typically faster to adopt new trends and area unit less doubtless to possess an automobile, implying a chance of adopting new mobility choices. The connected automobile market has the potential to considerably boost revenues for automakers within the next 5 to seven years and to determine nearer, additional profitable connections with their customers. The sophistication of the technologies is spectacular, however, success won't is a matter of the technology alone.

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